

with the reconstructed one. Depending on the pathology of the original carcinoma and a patient's family history, simple, subcutaneous or modified radical mastectomies may be necessary for the remaining breast. The mastectomy side and the remaining breast are usually treated in one surgical procedure.

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## Chronic Skin Ulceration After Radiotherapy for Cancer

SKIN ULCERS following radiation therapy continue to be a considerable problem for patients and physicians. Chronic painful, nonhealing ulcerations that worsen despite local treatment can develop in patients who may have had orthovoltage treatment 10 to 20 years ago. Even the newer techniques of supervoltage, while they spare the skin, occasionally result in the production of similar ulcers in skin or mucous membranes. Radiotherapy is being used more aggressively both for cure and palliation. The skin-sparing effects of the newer radiotherapy techniques undoubtedly deliver less radiation to the skin when therapy is directed at a deep lesion. Nevertheless, this deep delivery of radiation practically assures that if skin or mucous membrane chronic ulceration occurs, it will be on top of a heavily radiation-damaged tissue that may be particularly difficult to treat.

Traditionally, radiation skin damage and ulceration have been ascribed to microvascular occlusion. However, review of pathology specimens and of the original literature shows that such microvascular occlusion is rather sporadic in radiation-damaged tissue. Furthermore, many physicians, particularly those who operate on the head and neck, have noticed that radiated tissues, even though ulcerated, may bleed profusely from multiple small vessels when cut. Recent electron-microscopic studies in animal and human radiotherapy and in solar-radiation-damaged tissues have suggested that permanent damage to fibroblasts and fibroblast stem cells may be an important part of radiation skin damage. Rather than microvascular occlusion being the only cause, it is likely that fibroblasts permanently affected by

therapeutic radiation are unable to generate enough healing potential to contract open wounds and heal surgical wounds that have been made in radiated tissue.

Clinical studies recently conducted in San Diego County have indicated a change in complications of surgical intervention for radiotherapy skin ulcers. Older literature in plastic surgical procedures suggested that radiation ulcers could be excised and either skin grafted or covered with local flaps. Such procedures have been found to have an exceedingly high complication rate. Even well-vascularized myocutaneous flaps have a complication rate of 43 percent, with the major complication being the force of gravity pulling intact flaps off heavily radiated beds. In contrast, myocutaneous flaps used for reconstruction of non-ulcerated skin, such as in breast reconstruction, and omental flaps to cover full-thickness excision of chest wall have minimal complications.

In summary, recent studies of chronic radiation skin damage suggest that chronic fibroblast and fibroblast stem cell damage may be at least as important as microvascular occlusion. The changing techniques of radiotherapy are producing a different pattern of skin injury that will require more myocutaneous and omental flaps, and fewer skin grafts and local flaps, for reconstruction of these very challenging chronic wound problems.

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## Orthognathic Surgical Treatment

ORTHOGNATHIC SURGICAL TREATMENT pertains to the surgical rearrangement of the dental arches and their supporting structures. The goal of these procedures is to correct the dental arch relationship and to put into normal alignment the position of the maxilla and the mandible to other structures. The techniques now available are no longer limited to correction of the mandibular lantern-jaw deformity but are used on both jaws and can also be used for detailed bony adjustments and corrections for optimal aesthetic results.

Asymmetries and overdevelopment and underdevelopment in any part of the lower facial skeleton are approached primarily by the intraoral

route. Dissection, retraction and osteotomy instruments have been developed that markedly facilitate these surgical procedures.

As the conditions that require orthognathic surgical intervention are sometimes associated with other malformations and functional problems, it may be necessary to have the patient examined and treated by a team of specialists. Both pre-operative and postoperative orthodontic treatment is often necessary and preoperative evaluation and treatment plans should be developed in cooperation with an orthodontist.

It is technically possible to move the lower facial bony structures into any desired position. The important question is, in which position will the structures be stable and supported by the neuromuscular system and the various functions? In people who require both maxillary and mandibular surgical procedures, some surgeons prefer simultaneous operations. We have seen a number of problems following simultaneous repositioning of both jaws, that is, instability of corrected positions, relapse and malrotation (sagittal, frontal and horizontal). In patients where repositioning of both jaws is required, we have consistently corrected one jaw at a time and have not noted significant instability, relapse or malrotation. Each surgical procedure is first followed by a period of fixation and then by a period of bone induction treatment, which may last for several months. Despite the prolonged treatment time, our consistent long-term results justify the double procedures. At a recent national meeting, a panel of experts denied that problems exist with the simultaneous procedures, but regardless of the technique used by such experts, we have seen substantial deformities develop in a number of patients after simultaneous surgical procedures.

Anterior advancement of the mandible requiring interpositional bone grafts, as in hemifacial microsomia, has been successfully handled using bone induction treatments to establish the new bony structures, otherwise a major problem. Unfortunately, in those cases requiring bilateral expansion and bone grafting, for example, micrognathia, two operations are necessary as each side is best handled individually. Older techniques are prone to failure.

Chin modification through various osteotomies is often a part of orthognathic surgical treatment and can improve facial aesthetics considerably. Augmentation with onlay bone grafts has been a major problem because of bone resorption. De-

natured bone, which will soon be available, shows great promise as a new material for augmentation.

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## Body Contouring Operations

AS THE MEDIA have made American men and women more aware of their bodies, there has been an increased demand for body contour surgical procedures. The major body contouring procedure is the abdominal lipectomy or the abdominoplasty. The term "tummy tuck" is unfortunate because it denotes a very minor procedure, whereas almost all of the body contouring operations are major operative procedures.

The abdominoplasty operation, when successfully done, can easily conceal all of the resulting scars within a bathing suit line.

Some of the major contouring procedures on the thighs and hips are more difficult, and because of a patient's motion and sitting, the scars have a tendency to widen and to be uncomfortable for a patient undergoing this type of surgical procedure. However, with modern anesthesia and concepts in reduction, operations have been devised that allow a patient to wear a modest type of bathing suit with little of the scar showing.

With the thigh contouring operations, it is difficult for patients to move after surgical procedure, and they are required to either lie or stand for at least ten days before they are able to sit. This makes it difficult with respect to all of the natural processes of elimination.

Another area of interest is the contouring of arms. All of these procedures lend themselves better to those patients who have been obese and have lost weight and have hanging segments of soft tissue fat and skin. The problem in this case is that the incision is always made down the medial aspect of the arm and is difficult to conceal on a patient who wears short sleeves.

Generally, if a defect is great enough, patients do not mind the tradeoff for the major defect with a scar. In addition, large-busted patients who undergo breast reduction are greatly improved by a reduction of the tissue in the midaxillary line, which is done at the same time as in the arm. This is called a thoracobrahioplasty.